

# PROGRESS OF MEDICAL SCIENCE

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## SURGERY

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UNDER THE CHARGE OF

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**Treatment of Gunshot Wounds of the Knee-joint.**—PAGE (*British Med. Jour.*, September 1, 1917, 282) bases his study upon an analysis of 70 cases submitted to operation. Thus all cases with clean perforating wounds remaining clean coming under observation in the same period are omitted. There was articular bone injury in 59, the missile lodged in 51, recovery occurred without obvious infection of the joint in 45, amputations were done in 10, the deaths occurring after amputation were 4, and the total deaths 5. In dealing with wounds of the knee-joint the natural defensive powers of the part against infection should be borne in mind. To obtain fair play for the defense should be the aim of the surgical procedures adopted. Primary prophylactic (that is within twenty-four hours of injury) operations should be radical, and secondary operations undertaken on account of progressing infection, should, short of amputation, be planned on conservative lines. The expectant treatment of wounds of the knee-joint is only justifiable in the case of typical perforating injuries due to a rifle bullet. All wounds of the joint caused by shell fragments or distorted bullets should be considered as primarily infected. The primary prophylactic treatment should consist in the removal of any foreign bodies present and in the excision of the whole wound tract at the earliest possible time after injury. Any delay beyond twenty-four hours will entail failure in a certain proportion of cases. The results at present are particularly bad in casts in which gross comminution of the diaphysis is present. A primary excision or erosion of the joint (within twenty-four hours) would probably improve the results in such instances by preventing the development of entomyelitis. Repeated aspiration of the joint and the intra-articular injection of any of the antiseptics in use are calculated to prejudice the natural defense. It is safest to leave some drainage along the wound tract after operation for a few days, certainly when bone injury is present. Any infection then left may

become localized in the same way as occurs in the case of the peritoneum. A gauze wick makes a satisfactory form of drain. Immobilization of the joint during all critical periods is essential. An interrupted plaster-of-Paris splint affords the best means of effecting this. When general infection of the joint has taken place, treatment by fixation, lateral arthrotomy, and immunization gives the best chance of saving the limb, secondary abscesses are to be expected and should be evacuated after their complete development. Neither cross-section and flexion of the joint nor secondary excision of the knee are sound procedures.

**Injuries to the Peripheral Nerves and Their Treatment.**—MOYNIHAN (*Surg., Gynec. and Obst.*, 1917, xxv, 595) says that the earliest examination should be made of all wounds in which division of a nerve trunk is probable. If at the casualty clearing station such a lesion is found, end-to-end sutures should be adopted forthwith. This is most likely to be possible in cases in which primary suture of the wound, after excision, is found practicable. If secondary suture of the wounds after the Carrel-Dakin method has been employed, is to be undertaken the union of divided nerves should be secured at the same time. If these methods have been attempted and have failed they do not prejudice the later union of the nerve. On the contrary, they probably ensure that an easier and more satisfactory operation can then be practised. Throughout the whole period before late nerve suture is attempted the strictest attention must be paid to the relaxation and nutrition of all paralyzed muscles, to the maintenance of suppleness in all joints moved by these muscles and to the preservation of the integrity of the skin. Operations upon nerve trunks demand the most scrupulous observance of the ritual of asepsis. There must be the greatest gentleness of manipulation; the nerve must not be injured by instruments or by the surgeon's finger; it must not be separated from its sheath or disturbed overmuch from its bed; it must not be chilled or allowed to dry. All sutures must be of fine catgut and introduced with most punctilious accuracy. Axial rotation of the nerve must be avoided. The cut ends of the nerve before approximation must show clearly the fibers of which the trunk consists. Nerve-grafting is of little or no value; nerve anastomosis is to be sharply condemned; the turning down of flaps from the nerve to bridge a gap is useless. Tendon transplantation is of great value when nerve suture is impossible or when suture has given a result not entirely satisfactory.

**Gunshot Wounds of the Lungs and Pleura.**—MOYNIHAN (*Surg., Gynec. and Obst.*, 1917, xxv, 605) says that the approximate mortality from gunshot wounds of the chest at all parts of the line of communication is 20 per cent. The causes of death are hemorrhage, as a rule, within twenty-eight hours, and sepsis after the third or fourth day. The local conditions in wounds of the chest wall and lung are in all respects similar to those met with in wounds elsewhere. The missiles are the same, their destructive effects upon the tissues are the same, and the infecting organisms are the same. The lung tissue is more resistant to attack than many other tissues. The opening of the pleural cavity and the resulting exposure of a large serous sac to infection and all its consequences add, however, a danger of the most threatening character. The chief essential in the treatment of all cases of penetrat-

ing wound of the chest is rest. In clean, perforating wounds of the chest, rest, together with the cleansing and dressing of the wound of entrance or exit, will lead to the recovery of the great majority of cases. In cases of "open thorax" the earliest and most complete effort possible must be made to secure closure of the wound after an appropriate toilette. In those rare cases of grave hemorrhage when hemoptysis is present or when the blood escapes by the wound a direct access to the source of the bleeding must be obtained, when all contingent circumstances permit, and the wound in the lung must be treated by suture, preferably, or by plugging of the cavity from which the blood escapes. In cases of hemothorax, when the blood effused is small in quantity and remains sterile, no active measures are necessary unless absorption is long delayed. Aspiration, repeated if necessary, may then be performed. In cases of hemothorax, when the blood effused is large in quantity and sterile, aspiration after the seventh or eighth day, or earlier in cases of urgent dyspnea, certainly hastens convalescence, permits a more rapid expansion of the lung, and prevents the formation of adhesions which may permanently cripple the free movements of the lung. In cases of hemothorax whether the amount of blood is small or large, when infection takes place, open operation is necessary. Early operation, both when the Carrel-Dakin technic or Morison method are adopted, saves many weeks of convalescence and permits of a more perfect functional recovery. Small foreign bodies, or rifle bullets, embedded in the lung, often cause no symptoms; they become encapsulated and may safely be left. Larger foreign bodies retained in the lung may cause distressing or disabling symptoms for long periods. In such cases removal after resection or elevation of the fourth rib through an anterior incision will allow of the safe removal of the projectile from any part of the lung. Pieces of metal so removed are almost always infected.

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**Gunshot Wounds and Their Treatment.**—MOYNIHAN (*Surg., Gynec. and Obst.*, 1917, xxv; 583) says that perfect mechanical cleansing, that is, the excision of all contaminated, infected or dead parts, the removal of all fragments of clothing (by far the most important of all causes of continuing infection in a wound) and of all projectiles, is the supreme necessity in all cases. In early cases this may allow of immediate closure of the wound, which will be followed by healing in the great majority of cases, say in 80 per cent. or perhaps even in 90 per cent., of those in which there is no loss of tissue. In infected early cases the mechanical exposure and cleansing may be followed by a treatment directed to the removal of the remaining infection. Physiological and antiseptic methods have each their advocates. The aim of both is to permit of the earliest prudent secondary closure of the wound. In infected late cases a thorough mechanical exposure and cleansing of the wound and the parts around will allow of secondary closure forthwith if certain antiseptic pastes are used. Experience shows that similar results have followed upon this mechanical treatment of the wound without the introduction of antiseptics. A further trial in this class of cases may show that the natural defences of the tissues are ample to deal with the infections then remaining. It is the natural defensive powers of the body fluids and tissues, of serum and leuko-

cytes, that are the chief agents in finally subduing the bacterial infection in a wound. Sufficient reliance does not appear to be placed upon the stupendous power the body tissues possess for controlling infection. Finally, full emphasis must be laid on the paramount necessity for the complete immobility of wounded parts at all times and on all occasions. So will one of the most powerful agencies making for reinfection and auto-inoculation be kept in check.

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**Urinary Extravasation.**—WOLFER (*Surg., Gynec. and Obst.*, 1918, xxvi, 296) after a careful study of some 12 cases under his own care and 31 cases obtained from the records of the Cook County Hospital of Chicago, emphasizes the following points: Extravasation of clean urine may present few signs early and not produce marked reaction for a long period of time, up to two or four weeks, and then rapidly destroy life by sepsis. Urine in the presence of a stenosis of the urinary outlet is usually septic. Many cases of urinary extravasation are caused by a rupture of the urethra due to an inflammatory process, which can be detected before perforation. Urinary extravasation must be treated according to the condition of the urine. In clean urine cases, closure of the opening with drainage in cases of necrosis is the method of treatment. In septic cases, suprapubic cystostomy, with wide incisions in all infiltrated and edematous areas, rest to the urethra, and subsequent careful dilatation of the strictures, is the only safe method of procedure.

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## THERAPEUTICS

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**The Alkali Reserve in the Blood of Pellagrins.**—A study of a series of 36 pellagrins, in various stages of the disease, leads JOWLING and MAXWELL (*Jour. Am. Med. Assn.*, 1917, lxix, 2026) to conclude that the alkali reserve of the blood in pellagra does not vary from the normal in either the acute or the chronic cases; therefore there is no acidosis or alkalosis in pellagra. The viscosity of the blood shows a slight decrease from normal.

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**Stimulation of the Respiration by Sodium Cyanide and its Clinical Application.**—In a large series of animal experiments LOEVENHART and others (*Arch. Int. Med.*, 1918, xxi, 109) found that the intravenous injection of sodium cyanide caused a profound but fleeting stimulation of the respiratory center; that the continuous intravenous infusion produced a continued stimulation of the center; that the factor of safety was large, the effective dose being only about one-twentieth of the toxic.